

**REMARKS**

This Response and Amendment is filed in response to the Office Action dated May 4, 2005.

Claims 1-36 are pending in this application. The Applicant gratefully acknowledges the Examiner's allowance of Claim 34 and the Examiner's indication that Claims 25, 27, and 31-33 contain allowable subject matter.

On page 2 of the Office Action, the Examiner has identified the following two inventions in the application:

- |          |   |
|----------|---|
| Group I  | Claims 1-34, drawn to the apparatus of a centrifugal blower; and      |
| Group II | Claims 35 and 36, drawn to a method of manufacturing a one-piece fan. |

During a telephone conversation with the Examiner on April 19, 2005, the Applicant provisionally elected to prosecute the claims of Group I (Claims 1-34) with traverse. By this Amendment, the Applicant affirms the election of the claims of Group I for prosecution, but without traverse. In addition, the Applicant cancels the claims of Group II (Claims 35 and 36). The Applicant reserves the right to re-present the unelected claims in one or more divisional applications. Claims 1-34 are presented for consideration by way of the present Response and Amendment. By this Amendment, Claim 26 is amended to correct a typographical error.

On page 3 of the Office Action, Claims 25 and 26 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. Specifically, the Examiner states that the Applicant claims the first or second shrouds are non-rotating in Claims 25 and 26, but then claim in Claims 9 and 10 that both the first and second shrouds are fixed to the blades. The Applicant respectfully submits that the first shroud claimed in Claim 9 and the first non-rotating shroud claimed in Claim 25 are separate and distinct elements. With reference to FIG.

15 in the application, the first shroud 66 is fixed to the first side edges of the blades 46 for rotation with the blades 46, while the first non-rotating shroud 154a is closely spaced to the first side edges of the blades 46 and follows the contour of the first side edges of the blades 46.

Likewise, the Applicant respectfully submits that the second shroud claimed in Claim 10 and the second non-rotating shroud claimed in Claim 26 are separate and distinct elements. With continued reference to FIG. 15, the second shroud 66a is fixed to the second side edges of the blades 46 for rotation with the blades 46, while the second non-rotating shroud 154 is closely spaced to the second side edges of the blades 46 and follows the contour of the second side edges of the blades 46. As shown in FIG. 15, each of the first shroud 66, second shroud 66a, first non-rotating shroud 154a, and second non-rotating shroud 154 can be incorporated in the centrifugal blower 122a.

Accordingly, the Applicant respectfully requests withdrawal of the 35 U.S.C. § 112 rejection of Claims 25 and 26.

Also on page 3 of the Office Action, Claims 1-6, 8-14, 19, 20, 22, 23, 26, and 28 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,224,079 ("Dybvig") in view of U.S. Patent No. 4,904,158 ("Kun"). On page 8 of the Office Action, Claims 7, 21, and 24 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Dybvig in view of Kun as applied to Claim 6, and further in view of U.S. Patent No. 5,944,485 ("Maumus"). On page 9 of the Office Action, Claims 15-17 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Dybvig in view of Kun as applied to Claims 1, 2, or 4, and further in view of U.S. Patent No. 6,168,734 ("Botros"). On page 10 of the Office Action, Claim 18 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Dybvig in view of Kun taken with Maumus, as applied to Claim 7, and further in view of Botros. On page 11 of the Office Action, Claims 26 and 28-30 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Dybvig in view of

Kun as taken with Maumus and Botros as applied to Claims 1-24, and further in view of U.S. Patent No. 6,224,335 ("Parisi").

Independent Claim 1 recites (underlining added for emphasis):

A centrifugal blower, comprising a centrifugal fan comprising:

- a hub adapted for rotation about a central axis;
- a first plurality of blades arranged about the central axis, wherein each of the blades defines
  - a leading edge;
  - a trailing edge;
  - a first side edge extending between the leading edge and the trailing edge, the first side edge being swept from the leading edge in a direction axially away from the leading edge and radially outward toward the trailing edge;
  - a second side edge extending between the leading edge and the trailing edge, a portion of the second side edge integral with at least a portion of the hub, the second side edge being swept from the leading edge in a direction axially away from the leading edge and radially outward toward the trailing edge;
  - an inlet radius defined as an outermost radius of the blade leading edge;
  - a shroud integral with at least a portion of one of the first and second side edges of the first plurality of blades;
  - an intermediate radius defined as an innermost radius of the shroud;
  - a curvature in a first plane, the first plane extending through the blade and tangent to a cylinder which extends through the blade and is centered along the central axis, the cylinder being of a radius greater than a hub radius and less than the inlet radius; and
  - no curvature in a second plane, the second plane extending through the blade and tangent to a cylinder which extends through the blade and is centered along the central axis, the cylinder being of a radius greater than the intermediate radius.

To establish a *prima facie* case of obviousness under 35 U.S.C. § 103, three basic criteria must be met. First, there must be some suggestion or motivation, either in the

references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See MPEP § 2143.

Neither Dybvig, Kun, nor their combination teach or suggest a centrifugal fan including a hub, a first plurality of blades each having a leading edge, a trailing edge, a first side edge extending between the leading edge and trailing edge, a second side edge extending between the leading edge and trailing edge, in which a portion of the second side edge is integral with at least a portion of the hub, and in which at least a portion of one of the first and second side edges is integral with a shroud, an intermediate radius defined as an innermost radius of the shroud, and no curvature in a second plane tangent to a cylinder which extends through the blade and is centered along a central axis, the cylinder having a radius greater than the intermediate radius. Rather, Dybvig discloses a method of manufacture of turbine-type blower wheels. With reference to FIG. 4, blades 10 are struck or formed from an arcuate, flat sheet of metal from openings 20. Marginal portions 12, 14 support the blades 10 in proper spaced relation. FIG. 5 illustrates two of the arcuate sheets of metal superimposed on one another to double the number of blades 10, and spot welded at frequent intervals 15 to secure together the two sheets. To form the blower wheel, the two sheets are developed into a cylindrical form and the ends of the margins 12 are welded together and the ends of the margins 14 are welded together. FIG. 2 illustrates a frustum-conical member 30 joined to the margins 14. The member 30 includes flanges 34, 36, 38 for snugly clamping the margins 14 to the member 30. On the side opposite the member 30, the blower wheel includes a back-up member 50 having a frustum-conical portion 52 provided with slots 58 through which the tips 60 of the blades 10 project. The tips 60 of the blades 10 are bent into contact with the back-up member 50 to lock the blades in position. The back-up member 50 also includes flanges 70, 72, 74 that rigidly

clamp the margins 12 to the back-up member 50. The flanges 34, 36, 38 may be welded at spaced intervals to the margins 14, and the flanges 70, 72, 74 may be welded at spaced intervals to the margins 12.

On page 4 of the Office Action, the Examiner states that Dybig discloses "...a second side edge (of a blade 10)...integral with at least a portion of the hub (56),...(and) a shroud (30) integral with at least a portion of one of the first and second side edges (of the blade 10)...." The Applicant respectfully submits that the blades 10 are not integral with either the hub 56 or the member 30, as suggested by the Examiner. Dybvig fails to teach or suggest that the blades 10 can be integrally formed with either the hub 56 or the member 30.

Kun suffers from the same deficiencies as Dybvig. With reference to FIGS. 1 and 2, Kun discloses a solid impeller 1 mounted on a rotatable shaft 2. The impeller 1 includes a plurality of turbine blades 4 which form flow channels therebetween. On page 6 of the Office Action, the Examiner states that "Dybvig does not disclose curvature in the first plane, a lack of curvature in the second plane,... However, Kun teaches curvature in a first plane and no curvature in the second plane." The Applicant respectfully submits that the turbine blades 4 do not define "no curvature in the second plane," as suggested by the Examiner. If the Examiner considered the surface from which the turbine blades 4 project as a "shroud," then the innermost radius of the "shroud" or the "intermediate radius" would coincide with the bore through which the shaft 2 is inserted (see FIG. 1). The turbine blades 4 would then define a curvature in a second plane tangent to a cylinder which extends through the blade 4 and is centered along the central axis 3, the cylinder having a radius greater than the intermediate radius. Kun fails to teach or suggest that the turbine blades 4 have no curvature in a second plane tangent to a cylinder which extends through the blade 4 and is centered along the central axis 3, the cylinder having a radius greater than the intermediate radius.

The Applicant respectfully submits that the Examiner's combination of Dybvig and Kun does not teach or suggest all of the features claimed in independent Claim 1. "To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." See MPEP § 2143.03. Specifically, the combination of Dybvig and Kun does not teach or suggest a centrifugal fan including a shroud, an intermediate radius defined as an innermost radius of the shroud, and blades having no curvature in a second plane tangent to a cylinder which extends through the blade and is centered along a central axis, the cylinder having a radius greater than the intermediate radius.

Furthermore, "the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." See MPEP § 2143.01. There is no teaching or suggestion in Dybvig or Kun discussing the desirability of modifying the blower wheel disclosed by Dybvig to include the turbine blades disclosed by Kun. Dybvig discloses a method for striking or punching blades 10 from flat sheets of metal, and welding two sheets together at their margins 12, 14 to make the blower wheel. Kun appears to disclose a one-piece cast impeller 1. Modifying the blower wheel disclosed by Dybvig to include the cast blades disclosed by Kun would require Dybvig's blower wheel to be significantly re-designed, with no motivation regarding why such a re-design would be necessary or desirable.

Applicant filed a supplemental Information Disclosure Statement on June 1, 2005 citing British Patent No. 761,937 ("Garrett Corporation," or "Garrett") and U.S. Patent No. 2,422,615 ("Halford"), which were cited in corresponding PCT Patent Application No. PCT/US05/002237. Neither Garrett, Halford, nor their combination teach or suggest a centrifugal fan including a hub, a first plurality of blades each having a leading edge, a trailing edge, a first side edge extending between the leading edge and trailing edge, a second side edge extending between the leading edge and trailing edge, in which a portion of the second side edge is integral with at

least a portion of the hub, and in which at least a portion of one of the first and second side edges is integral with a shroud, an intermediate radius defined as an innermost radius of the shroud, and no curvature in a second plane tangent to a cylinder which extends through the blade and is centered along a central axis, the cylinder having a radius greater than the intermediate radius. Rather, Garrett discloses an impeller member 11 including a plurality of impeller blades 17 (see FIGS. 1 and 2) mounted to a disk 16. A cylindrical ring 31, which is a separate and distinct component from the blades 17, is mounted to the periphery of the entry edges 18 of the blades 17. A plurality of axial-flow blades 30 are mounted to the ring 31.

The same argument with respect to Kun above applies with equal weight to Garrett. If the Examiner considered the disk 16 as a "shroud," then the innermost radius of the "shroud" or the "intermediate radius" would coincide with the bore through which the shaft 12 is inserted (see FIG. 1). The blades 17 would then define a curvature in a second plane tangent to a cylinder which extends through the blade 17 and is centered along a central axis, the cylinder having a radius greater than the intermediate radius. Garrett fails to teach or suggest that the blades 17 have no curvature in a second plane tangent to a cylinder which extends through the blade 17 and is centered along a central axis, the cylinder having a radius greater than the intermediate radius. If the Examiner considered the ring 31 as a "shroud," then the "shroud" would not be integral with the blades 17. Garrett fails to teach or suggest that the cylindrical ring 31 can be integrally formed with the blades 17.

Halford suffers from the same deficiencies as Garrett. Halford discloses an impeller including a boss A and a plurality of blades projecting from the boss A (see FIGS. 3 and 4). The same argument with respect to Kun above applies with equal weight to Halford. Halford fails to teach or suggest a centrifugal fan including a shroud, an intermediate radius defined as an innermost radius of the shroud, and blades having no curvature in a second plane tangent to a

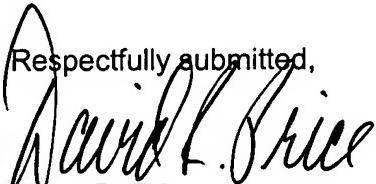
cylinder which extends through the blade and is centered along a central axis, the cylinder having a radius greater than the intermediate radius.

Accordingly, the Applicant respectfully requests withdrawal of the 35 U.S.C. § 103(a) rejection of independent Claim 1.

Claims 2-33 are each ultimately dependent upon independent Claim 1, and are believed to be allowable based upon Claim 1 and upon other features and elements claimed in Claims 2-33 but not discussed herein.

CONCLUSION

In view of the amendments and remarks presented herein, it is respectfully submitted that the claims as amended are in condition for allowance. The Applicant kindly requests that the Examiner telephone the attorneys of record in the event a telephone discussion would be helpful in advancing the prosecution of the present application.

Respectfully submitted,  
  
David R. Price  
Reg. No. 31,557

Michael Best & Friedrich LLP  
100 East Wisconsin Avenue  
Suite 3300  
414.271.6560